Abstract: The structural lineament mapping of southern India along withgeological, geochronological datasets help in redefining the Precambrian crustal blocks.The newly proposed Kumta and Mercara suture zones welding Archean crustal blocks in western peninsular India offer critical insights into the crustal evolution of Gondwana. The Kumta suturemainly consists of schistose rocks including quartz-phengite, garnet-biotite, chlorite, fuchsite and marble, whereas the Mercara suture contains mylonitic quartzo-feldspathic gneiss, garnet-kyanite-sillimanite gneiss, calc-silicate granulite and metagabbro. Metamorphic pressure-temperature estimations (Kumta suture: 11-18 kbar at 790-550^{o}C; Mercara suture: 13 kbar at 825^{o}C) suggest that, the sediments have undergone subduction to greater depths. The K-Ar age of biotite, phengite and U-Pb dating of zircon yields consistent metamorphic age of 1100-1400 Ma. In situ zircon ^{176}Lu/^{177}Hf isotope analysisshowswide range of εHf (t) values indicating the protolith sediments were derived from Paleo-Neoarchean juvenile crust that mixed with recycled older crust. The Bondla ultramafic-gabbro complex, northwest of the Kumta suture contains basalt, dolerite, gabbro, serpentinite, chromitite, peridotite and chromian spinel chemistry suggests evolution in a supra-subduction zone arc tectonic setting.The Sirsi shelf towards east of the Kumta suture, contains weakly deformed sedimentary rocks (limestone, shale, banded iron formations, greywacke, sandstone and quartzite) unconformable on relatively high-grade *ca.* 2571 Ma gneisses of the Dharwar craton. The Karwar block to the west is composed of weakly metamorphosed*ca.* 3200 Ma tonalite-trondhjemite-granodiorite (TTG) with enclaves of amphibolite. In situ zircon ^{176}Lu/^{177}Hf isotope analysis and whole-rock ^{143}Nd/^{144}Nd isotopic analysis of TTGs show positive εHf and εNd values indicating *ca.* 3200 Ma juvenile crust. The Coorg block consists of *ca.* 3200 Ma charnockite, mafic granulites, hornblende-biotite gneiss, garnet-hornblende gabbro and anorthosite.In situ zircon ^{176}Lu/^{177}Hf isotope analysis indicates source as mixture of juvenile crust and older recycled crustal materials. Synthesis of the above results with published data suggests that Kumta and Mercara suture zones incorporate Paleoarchean to Mesoproterozoic sedimentssubjected to high-pressure metamorphism in the late Mesoproterozoic. Metamorphic P-T estimations of mafic granulite and U-Pb zircon geochronology of pelitic gneisses from Betsimisaraka suture zone, Madagascar suggests the rocks were underwent metamorphism at *c.* 24 kbar and *c.* 780°C during Mesoproterozoic suturing of Antongil-Masora blocks with the Antananarivo block.From the integration of above results with the new geophysical results and published data Mesoproterozoic Kumta-Mercara suture is interpreted as eastern extension of the Mesoproterozoic Betsimisaraka suture of Madagascar into western India.